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BILIOGRAPHY OF THE LOCO WEED.

By L. E. Sayre, University of Kansas, Lawrence.

Read before the Academy, at Manhattan, November 26, 1903.

THERE are perhaps few plants of the vegetable kingdom that have excited more interest of a general character than that of the *Astragalus mollissimus*. This is due to its alleged property of producing, when eaten by animals, a condition which is known as "locoism"; this term being derived from the Spanish word *loco*, meaning crazy, hence the common name of "crazy weed." We have been interested in compiling the various papers concerning this weed, and present herewith to the Academy a bibliography, so far as we have been able to obtain data, original papers, etc.

We desire to state in this connection that during the past year we have endeavored to ascertain the food value of loco. Our own laboratory results pointed to the fact that if the plant was not poisonous it would not be a bad stock food, but for confirmation of our results we had authentic material collected, such as the animal feeds upon, derived from the *Astragalus mollissimus* (loco) and sent to the department of agriculture at Manhattan, and through the kindness of J. T. Willard, of the chemical laboratory, we have the following report of the analysis:

Crude protein	14.73	per cent.
Ether extract	2.31	"
Nitrogen-free extract	40.22	"
Crude fiber	30.39	"
Moisture	6.51	"
Ash	5.84	"

For the purpose of comparison, we tabulate the analyses of well-known foodstuffs. These analyses were taken from the reports of the Experimental Station of Kansas and those of the Department of Agriculture, at Washington. The figures represent average composition.

	Per cent. water	Per cent. crude protein	Per cent. ether extract	Per cent. nitrogen-free extract.	Per cent. crude fiber	Per cent. ash.
Loco	6.51	14.73	2.31	40.22	30.39	5.40
Alfalfa, dry	8.40	14.30	2.20	31.40	25.00	7.90
Clover, Alsike	9.70	3.90	0.90	40.70	7.40	8.30
Clover, Red	15.30	4.40	1.10	31.80	8.10	6.24
Clover, White	9.70	15.70	2.90	39.30	....	8.30
Clover, Crimson	9.60	3.10	0.70	36.60	5.20	8.60
Clover, Japan	11.00	13.80	3.70	39.00	24.00	8.50
Timothy	13.20	5.90	2.50	45.00	29.00	4.40
Corn-fodder	42.20	4.50	1.60	34.70	14.30	2.70
Sorghum	12.80	9.10	3.60	69.80	2.60	2.10
Kafir-corn (field cured)	19.20	4.80	1.60	39.60	26.80	8.00
Oats	16.00	7.40	2.70	40.60	27.20	6.10
Bran, wheat	11.90	15.40	4.00	53.90	9.00	5.80

If we take the view that loco weed is non-poisonous, and that the peculiar symptoms which follow the ingestion of the weed in large quantities for a long-continued period be due to a malnutrition or a disturbed condition of the digestive tract, we naturally look to a possible mechanical disturbance brought about by one or more of the elements making up the structure of the leaf. This we find in innumerable unicellular hairs which cause the characteristic pubescence of the leaf. These hairs seem to constitute about one-third of the weight and over one-half of the bulk of the powder.

We append below the bibliography relating to this interesting subject:

LOCO WEED.

Description of: L. H. Pammel, professor botany, Iowa Agricultural College. *The Vis Medicatrix*, June, 1891, p. 40 (journal of the Iowa State Medical Society). The article contains figure of rattle-box (Crotalaria sagittalis).

WOOLLY LOCO WEED; STEMLESS LOCO WEED; RATTLE-BOX.

Description of: V. K. Chestnut, U. S. Dept. of Agriculture, division of botany. Principal Poisonous Plants of the United States. Bulletin No. 20, 1898, p. 29.

Fig. 12.—Woolly loco weed (Astragalus mollissimus).
" 13.—Stemless loco weed (Argallus lambertii).
" 14.—Rattle-box (Crotalaria sagittalis).

Description of: V. K. Chestnut, assistant botanist, U. S. Dept. of Agriculture. . Thirty Poisonous Plants of the United States. Farmers' Bulletin, No. 86, 1898, p. 14.

Fig. 8.—Woolly loco weed (Astragalus mollissimus).
" 9.—Stemless loco weed (Argallus lambertii).
" 10.—Rattle-box (Crotalaria sagittalis).

WHITE LOCO WEED.

Description of: V. K. Chestnut and E. V. Wilcox, department of botany, U. S. Dept. of Agriculture. The Stock-poisoning Plants of Montana. Bulletin No. 36, 1901, p. 86.

Plate 9.—White loco weed (Argallus spicatus) in flower.
" 10.—White loco weed (Argallus spicatus) in fruit.

SILVERY LOCO WEED; PURPLE LOCO WEED.

Description of: V. K. Chestnut and E. V. Wilcox, division of botany, U. S. Dept. of Agriculture. The Stock-poisoning Plants of Montana. Bulletin No. 36, 1901, pp. 99, 100.

Plate 11.—Silvery loco weed (Argallus splendens).
" 12.—Purple loco weed (Argallus besseye).
" 13.—Purple loco weed (Argallus lagopus).

LOCO, OR CRAZY WEED.

Description of: J. U. Lloyd, Cincinnati, Ohio. *The Eclectic Medical Journal*, Oct., 1893, Art. XCI.

LOCO WEED.

Description of: Dr. F. B. Power and J. Cambier. The Pharmaceutical Rundschau, 1889, p. 134.

Fig.—Crotalaria sagittalis.

Yerba Loco.
The Druggists' Bulletin, May, 1889, p. 134.

Loco Weeds.
Description of: V. K. Chestnut, B. S., assistant, division of botany, U. S. Dept. of Agriculture. Preliminary Catalogue of Plants Poisonous to Stock, p. 404.
Fig. 50.—Woolly loco weed (Astragalus mollissimus).

Loco.
Some Observations upon Loco, Bulletin No. 35, Dec., 1892.
Experiment Station, Kansas State Agricultural College.
Plate XV.—Loco weed (Astragalus mollissimus).
Description of: David O'Brien, chemist, State Agricultural College, Fort Collins, Colo. Progress Bulletin on Loco and Larkspur, Oct., 1893.

Loco Weed.
The Importance of Scientific Investigation. L. E. Sayre, Ph. G. Proceedings of the American Pharmaceutical Association, Sept., 1888, p. 107.
L. E. Sayre, Ph. G. Proceedings of the American Pharmaceutical Association, vol. 38, 1890, p. 107.
Description of: L. E. Sayre, University of Kansas, Lawrence. The Transactions of the Kansas Academy of Science, XVIII, p. 141.
Fig. 5, Astragalus mollissimus, p. 195.
Description of: L. E. Sayre, Ph. G., Kansas State University, department of pharmacy. The Transactions of the Kansas Academy of Science, vol. X.
Paper by L. E. Sayre. *The Druggists' Circular and Chemical Gazette*, Feb., 1903, p. 27.
Description by L. E. Sayre, Ph. G., department of pharmacy, University of Kansas. The Biennial Report of the Kansas State Board of Agriculture, vol. X, 1885–'86, p. 209, part II.
By L. E. Sayre, Ph. G., University of Kansas, school of pharmacy. The Biennial Report of the Kansas State Board of Agriculture, vol. XII, 1889–'90, p. 97, part II.
By L. E. Sayre, Ph. G., department of pharmacy, University of Kansas. The Biennial Report of the Kansas State Board of Agriculture, vol. XI. 1887–'88, p. 147, part II.
By L. E. Sayre, Ph. G., school of pharmacy, University of Kansas, The Biennial Report of the Kansas State Board of Agriculture, vol. XIII, 1891–'92, p. 163, part II.
Description of: The Proceedings of the American Pharmaceutical Association, 1879, p. 611.

Astragalus mollissimus ("Loco").
By L. E. Sayre, Ph. G. *Western Drug Record*, Nov., 1886, p. 18.
Fig.—Astragalus mollissimus.

Loco Weed.
By L. E. Sayre, Ph. G., department of pharmacy, University of Kansas. *The Druggists' Bulletin* 1889, p. 145.
Fig. I.—Osytropus lambertii.
Fig. II.—Astragalus mollissimus.
Fig. III.—Astragalus tridactylicus.
The Active Principles of Loco Weed. L. E. Sayre, Ph. G., Kansas State University, Lawrence, Kan. *The Pharmaceutical Era*, 1890, p. 251.

The Poisonous Principle of Loco Weed. H. C. Oatman, University of Kansas. Notes on New Remedies, 1891, p. 14.

Report on Loco Weed. L. E. Sayre, Ph. G., department of pharmacy, Kansas State University. Notes on New Remedies, 1891, p. 79.

Paper. L. E. Sayre, Ph. G. Proceedings of the Kansas Pharmaceutical Association, May, 1888, p. 43.

Problem of. *Western Drug Record*, Jan., 1889.

The Active Principles of Loco Weed. L. E. Sayre, Ph. G., department of pharmacy, Kansas State University. *Western Drug Record*, vol. 5, p. 109.

Loco.

Special theses on loco, from school of pharmacy, University of Kansas (unpublished).

By A. J. Noble. June, 1902.
By R. J. McClure. June, 1888.
By L. W. Snepp. June, 1889.
By W. E. Henry. 1900.

WHAT IS INSANITY IN LOWER ANIMALS?

By L. E. Sayre. *Kansas Medical Journal*, Feb., 1904.

THE LOCO DIVISION.

By L. E. Sayre. *Kansas Medical Journal*, March, 1904.